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Bell's Outdoor and Indoor Experimental Arithmetics

Fourth Year's Course
(Standard VI)

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BELL'S Outdoor and Indoor Experimental Arithmetics

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FOURTH YEAR'S COURSE (Standard VI.)

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FOREWORD.

THE aim of this series is to lead children—by experiment, inference, comparison and contrast—to form a real conception of Length, Area, Weight and Volume.

Each experiment has a definite end in view; either the establishment of an abstract principle, or the practical proof of a theoretical calculation.

The exercises are intended to be taken at times specially set apart for practical work, as it is generally found to be inconvenient to combine practical and theoretical exercises in the same lesson.

They provide, moreover, an interesting and ample course of hand and eye training, which, preceding the theory lesson as it should, has the effect of stimulating the child's activities, and associating in his mind the world of things with the world of ideas.

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OUTDOOR AND INDOOR EXPERIMENTAL ARITHMETIC.

FOURTH YEAR'S COURSE.

SECTION I.—LENGTH.

1. Examination of the Chain.

(a) Extend the chain, and ascertain its length by means of the tape measure.

(b) The parts of a chain.

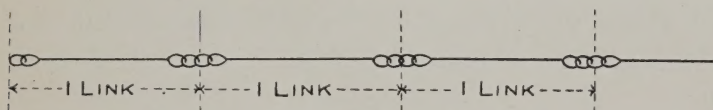


FIG. 1.

Make a sketch of the above in your note-book.

(c) Count the number of links in the chain, and record the result in your note-book.

(d) Examine the brass marks, or "tabs," attached to the chain, and notice the differences in shape.

Make a sketch of these in your note-book, one underneath the other.

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(e) Find the distance in links of each tab from both ends of the chain, and record results by the side of the previous sketches thus :

	Tab.	Number of Links from one end.	Number of Links from other end.
<i>e.g.</i>		10	90

2. Exercises on the Chain.

(a) Working from one end, tie small pieces of string on the chain, at the following distances :

- (i) 33 links. (ii) 49 links.
(iii) 78 links. (iv) 96 links.

(b) Pieces of coloured wool will be tied on the chain by the teacher. Find their distances from both ends of the chain.

Record your results thus :

	Colour of Wool.	Distance (1).	Distance (2)	Check of Chain Length.
<i>e.g.</i>	Yellow	42 links	58 links	100 links

3. Stepping the Chain.

Extend the chain in a straight line. Practise walking parallel to the chain, until the number of steps taken is 22.

Each step will then be 1 yard in length.

Record results of your stepping thus :

	Trial.	Number of Steps taken.	Nature of Step.
<i>e.g.</i>	1	25	Too short

4. Measurements of Length by Stepping.

Remember to walk in a straight line.

(a) Calculate by stepping :

- (i) Length of playground.
- (ii) Width of playground.
- (iii) Corner to corner of playground.
- (iv) Length of football pitch.
- (v) Width of football pitch.
- (vi) Corner to corner of football pitch.

Record results thus :

	Distance stepped.	Result.
<i>e.g.</i>	Length of playground (i)	31 yds.

(b) *Measure* with the chain the distances which you have stepped. Add to your recorded results thus :

	Distance stepped.	Result.	Actual Distance		Amount of Error.
			Chains.	Yards.	
<i>e.g.</i>	Length of playground (i)	31 yds.	1.51	33.22	2.22 yds.
TOTAL ERROR =					
AVERAGE ERROR =					

5. To Step given Distances.

- (a) (i) 57 yards.
 (ii) 2 chains.
 (iii) 3 chains 26 links. } Convert (ii) and (iii) into
 yards before stepping.

(b) *Measure* with the chain the distances required to be stepped in Ex. 5 (a). Record results thus :

	Distance to be stepped.	Actual Distance.		Amount of Error.
		Chains.	Yards.	
<i>e.g.</i>	(i) 57 yds.	2.52	55.44	1.56 yds.
TOTAL ERROR =				
AVERAGE ERROR =				

6. Estimating from a Line in Yards.

(a) *Estimate*, by sight, the distances of children from a given fixed line. Record results.

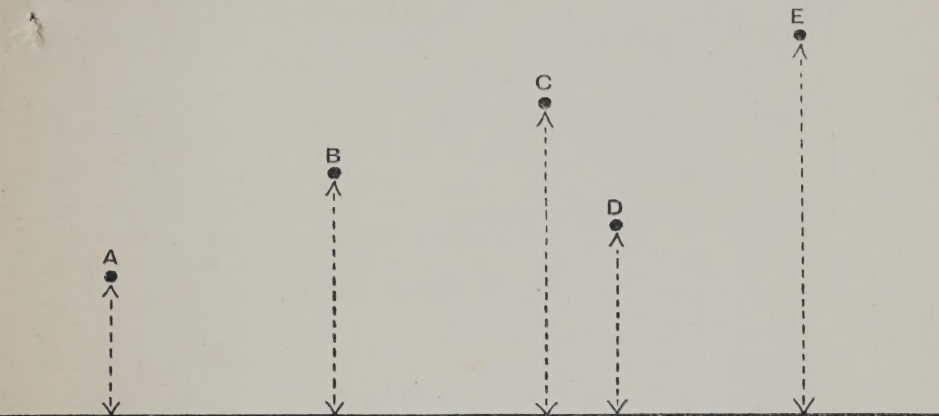


FIG. 2.—Judging Distance.

Line from which distances of Scholars should be estimated.

(b) Find by means of the *tape measure* the actual distances of children from the line in Ex. 6 (a). Record results thus :

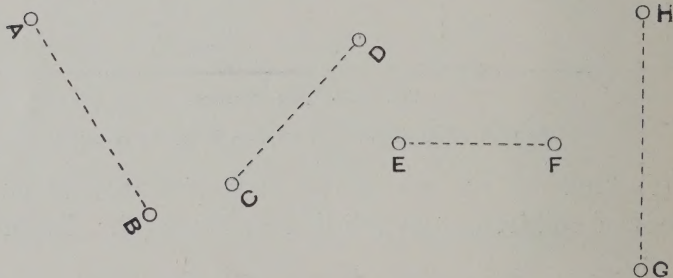
	Distance.	Estimated at	Actual Distance (Tape Measure).	Amount of Error.
<i>e.g.</i>	A	11 yds.	9 yds. 2 ft.	1 yd. 1 ft.

7. Estimating Distances between Points.

(a) *Estimate*, by sight, the distances between boys placed in certain positions by the teacher. Record results.

(b) *Measure* with the chain the distances in the preceding exercise (Ex. 7 (a)). Add to your recorded results thus :

Distance.	Estimated at	Actual Distance.		Amount of Error.
		Chains.	Yards.	
<i>e.g.</i> AB	37 yds.	1.59	34.98	2.02 yds.
TOTAL ERROR =				
AVERAGE ERROR =				



SCHOLARS ON THIS LINE.

FIG. 3.

8. The Circle.

(a) From a spot marked on the playground, in turn, step a distance of 10 yards, as indicated in Diagrams 4, 5, and 6.

(b) Mark on the ground, with chalk, the final position of your heel.

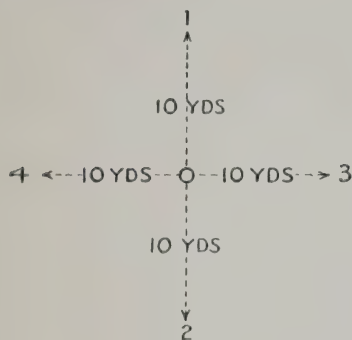


FIG. 4.

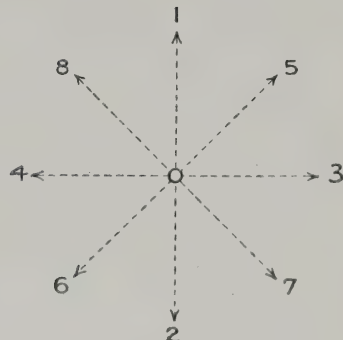


FIG. 5.

(c) By means of a curved line, join the mark of your position with that of your right-hand neighbour (Diagram 7).

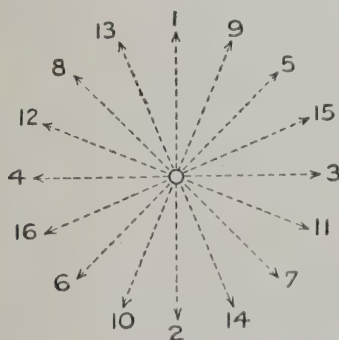


FIG. 6.

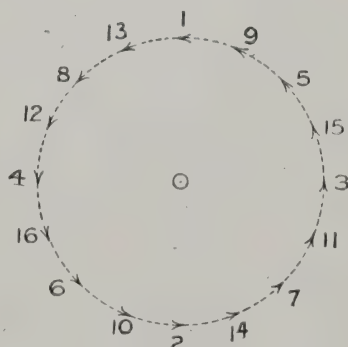


FIG. 7.

(d) Make a sketch in your note-book of what has been done, and write down the name of the figure which the chalk line should represent.

9. Circumference and Diameter.

(a) Commencing from your own position, step *round* the line on the playground till you arrive at your starting point again.

Record distance in your note-book.

This distance is called the Circumference of the circle.

(b) Commencing from Position 1 (Diagram 5), step in a straight line through the centre to Position 2.

(c) Repeat the exercise, taking two other points on the circumference. Record these distances, and find the average.

This distance is called the Diameter of the circle.

(d) Make columns, as follow, and complete :

	Circumference of Circle.	Diameter of Circle.	Circumf. $\div$ Diameter.
e.g.	65 yds.	20 yds.	3.25
		TOTAL =	
		AVERAGE =	

Note.—The relation between the circumference of a circle and its diameter is known as π (Pi).

10. Value of π .

Make columns, as follow, and complete :

I.	Greatest Value of π obtained in Ex. 9 (d).	Least Value of π obtained in Ex. 9 (d).	Difference.

II.

Values of π obtained in Ex. 9 (d).	Approximate Value of π .	Difference.
	3.1416	
	TOTAL =	
	AVERAGE =	

11. Metric Exercises—Hectometre.

(a) From a given point, step a distance of 100 metres, or 1 hectometre (1 Hm.).

(b) Measure the distance you have stepped, and record result thus :

	Distance to be Stepped.	Distance by Measurement.	Amount of Error.
<i>e.g.</i>	100 metres = 1 Hm.	109 metres = 1.09 Hm.	9 metres = .09 Hm.

12. Metric Exercises—Fourth Part of Kilometre.

(a) Step a distance of 250 metres. This will be one-quarter of a kilometre.

(b) Check by means of the metric tape measure, record results, and obtain your error.

13. Graph of Height.

(a) Measure your height at regular intervals, and record your results as shown by the graph.

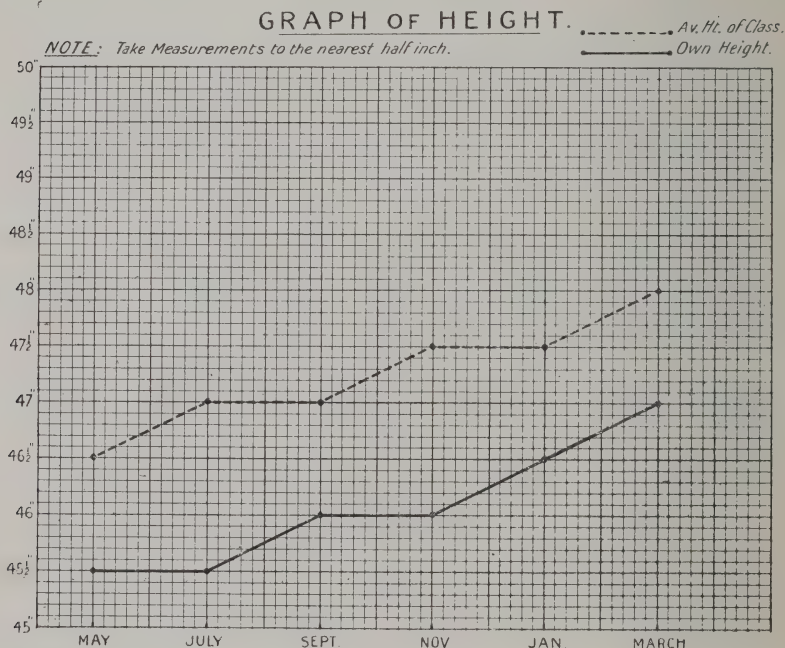


FIG. 8.

(b) Insert also the average height of the class as indicated.

(c) By how much does your height differ from the average height?

SECTION II.—AREA.

14. The Square.

Construct, and cut out in paper or cardboard, squares of following dimensions :

- (a) Side $3\frac{1}{4}$ ins.
- (b) Side $2\frac{7}{8}$ ins.
- (c) Side $4\frac{3}{10}$ ins.

Letter them as above, calculate the area of each, and tabulate your work thus :

Letter.	Side (S).	Area (A).
(a)	$3\frac{1}{4}$ ins.	$(3\frac{1}{4} \times 3\frac{1}{4})$ sq. ins. = sq. ins.
(b)		
(c)		

15. The Right-Angled Triangle.

Fold each of the above squares diagonally, *i.e.* from corner to corner, and find the area (*a*) of the shaded triangles.

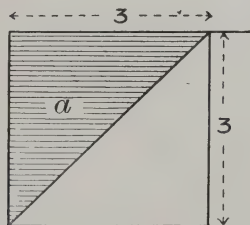


FIG. 9.

Enter your results as in Exercise 14.

16. The Rectangle.

(a) Construct and cut out rectangles of the following dimensions :

- (i) $4\frac{1}{8}$ ins. $\times$ $2\frac{1}{10}$ ins.
- (ii) $6\frac{1}{4}$ ins. $\times$ $3\frac{2}{5}$ ins.
- (iii) $5\frac{3}{8}$ ins. $\times$ $2\frac{4}{5}$ ins.

(b) Number them as above, calculate the area of each, and tabulate as in Exercise 14.

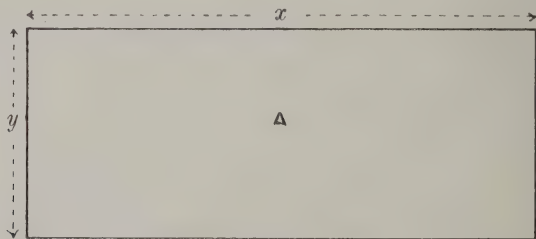


FIG. 10.

(c) Fold the above rectangles diagonally, and cut along the fold. Calculate the area of each of the two equal triangles.

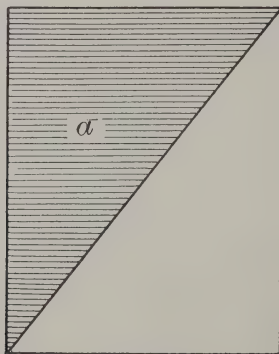


FIG. 11.

17. Surface of Objects.

Calculate the area of the total surfaces of the models supplied to you, *i.e.* match-box, brick, tile, tin-box.

18. Any Triangle.

(a) Construct a triangle ABC of the following dimensions :
 $AB = 6\frac{1}{4}$ ins., $BC = 7\frac{1}{10}$ ins., $AC = 5\frac{5}{8}$ ins.

(b) From A drop a perpendicular AP to BC .

(c) Bisect AP in Q , and through Q draw RQS parallel to BC .

(d) Drop perpendiculars RT and SV to BC .

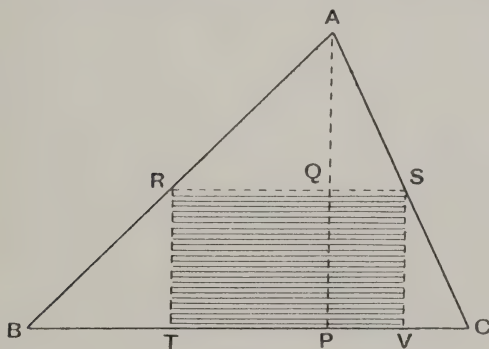


FIG. 12.

(e) Fold along RS , RT and SV so that A , B and C meet at P .

(i) What is the length of TV as compared with BC ?

(ii) What is the relation between the area of the rectangle and the areas of the triangles that are folded over it ?

(iii) What is the relation between the area of the rectangle and the area of the whole triangle ?

(iv) How would you find the area of the whole triangle ?
Calculate the same by any method you can think of.

19. Areas of Triangles.

Find the areas of the cardboard triangles supplied to you.
Take measurements in inches and tenths.

Tabulate your answers as below.

No.	Base.	Height.	Area.
<i>e.g.</i> 5	4.5 ins.	4 ins.	$\frac{4.5 \times 4}{2}$ sq. ins. = 9 sq. ins.

20. The Rhombus.

(a) Construct and cut out a rhombus $ABCD$. Side = $4\frac{7}{8}$ ins.,
 $\angle ABC = 60^\circ$.

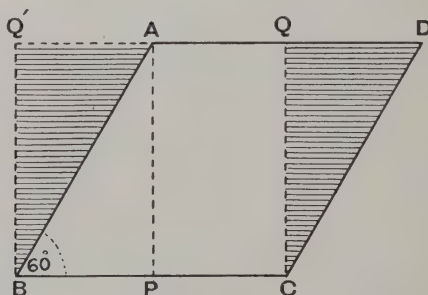


FIG. 13.

(b) Draw AP perpendicular to BC , and CQ perpendicular to AD .

(c) Cut along QC , and fit on opposite side of rhombus, as shewn in diagram.

(i) Find the area of the figure as it now lies.

(ii) Write down the rule for finding the area of a rhombus.

21. Areas of Rhombuses and Rhomboids.

Calculate in sq. ins. and sq. cms. the areas of the rhombuses and rhomboids supplied to you.

Tabulate your answers as before.

22. The Circle.

(a) Construct a circle with radius $1\frac{1}{2}$ ins.

(b) Divide it into quadrants, and each quadrant into eight sectors.

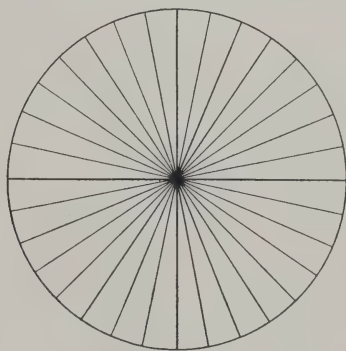


FIG. 14.

(c) Cut out the 32 sectors, and paste them side by side, as shewn in Fig. 15, so as to form a rectangle, as nearly as possible.

(i) Measure the length and breadth of the figure as in Diagram 15, and calculate its area.

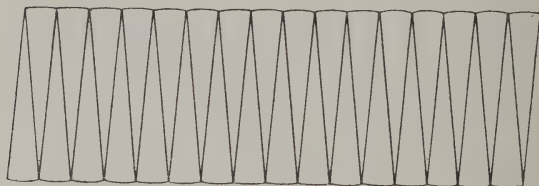


FIG. 15.

(ii) What is the relation between the length and breadth ?

(iii) What is the breadth ?

(iv) Given the radius of a circle, how can you find its area ?

Measurements with Chain and Tape Measure.

23. The Square Chain, Pole, Yard, Dekametre and Metre.

Mark out in the playground the following figures, as shewn in Fig. 16.

- (a) Square chain.
- (b) „ dekametre.
- (c) „ pole.
- (d) „ yard.
- (e) „ metre.

Using the tape measures, or yard and metre sticks, find the length of side of each figure :

- (a) In feet,
- (b) In metres, etc.

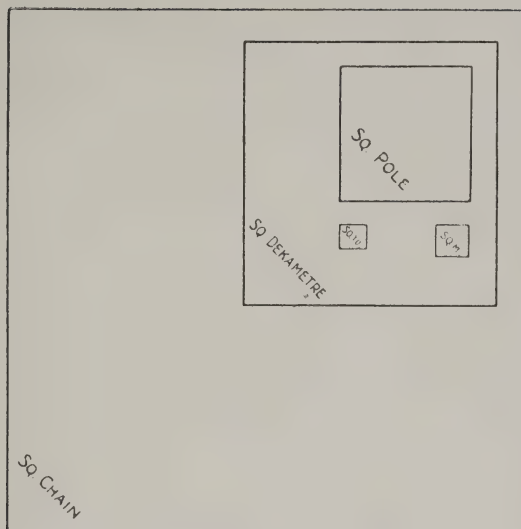


FIG. 16.

Calculate the area of each figure in sq. ft. and sq. metres, and tabulate your work thus :

Figure.	Length of Side.		Area.	
	Feet.	Metres.	Square Feet.	Square Metres.
Square chain	66	20.1	$(66 \times 66) =$	$(20.1 \times 20.1) =$

24. Square Dekametre, Pole and Chain.

From the above, find as nearly as you can

- (a) How many sq. Dm. make 1 sq. chn.
- (b) „ sq. poles „ 1 sq. chn.
- (c) „ sq. poles „ 1 sq. Dm.

25. Areas of Figures.

(a) Lay down in the playground figures as shewn in diagrams.

(b) By using your tape measures, or yard and metre sticks, calculate the area of each in sq. ft. and sq. dms.

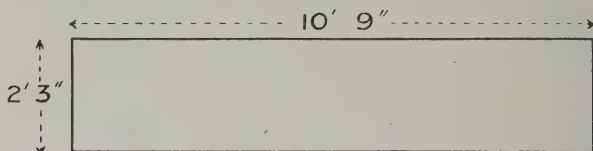


FIG. 17.

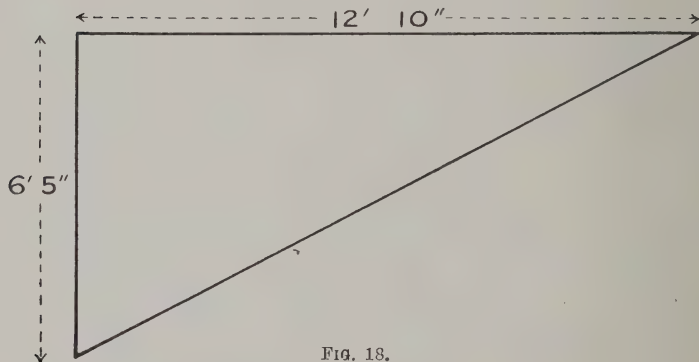


FIG. 18.

Find Area
of
Shaded Part.

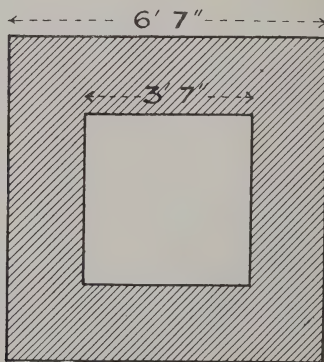


FIG. 19.

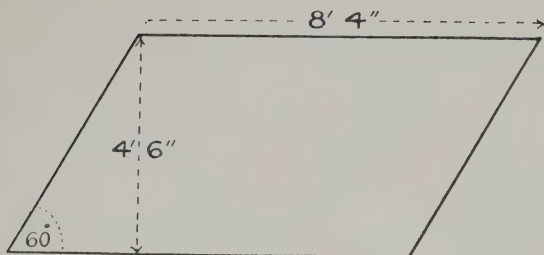


FIG. 20.

Record results thus :

No. of Fig.	Length.		Breadth.		Area.	
	Feet.	dms.	Feet.	dms.	Sq. ft.	Sq. dms.

26. Setting Out a Square Chain.

(a) Using the chain and cross staff, mark out on the field 1 sq. chain, by means of flags.

(b) Step the lengths of the sides, and calculate its area in square yds. Enter in your book.

27. Setting Out an Acre.

In a similar manner, mark off by flags a rectangle 4 chns. long and 2 chns. 50 lks. wide. Calculate its area,

(a) In sq. yds. after stepping,

(b) In sq. chns. from the dimensions.

Convert sq. chns. to sq. yds., and find the amount of error.
Record results thus :

(a)	Length in Yds.	Width in Yds.	Area in Sq. Yds.	
(b)	Length in Chns.	Width in Chns.	Area in Sq. Chns. =	Sq. Yds.
AMOUNT OF ERROR =				

28. The Principle of taking Offsets.

(a) Place three sticks or poles bearing small flags in the ground some distance apart, so as to form a large triangle (Fig. 21).

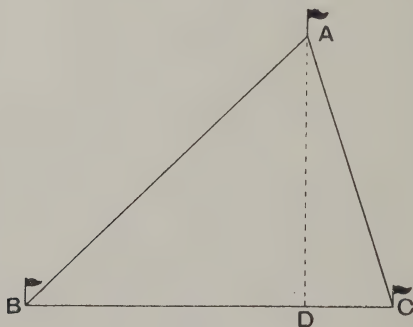


FIG. 21.

(b) Starting at *B* with the chain, proceed in the direction of *C*.

(c) At *D* sight *A* and *C* at the same time with the cross-staff, and measure *AD*.

(d) Complete the measurement of *BC*.

(e) Find the area of the enclosed triangle.

(f) Repeat the exercise by stepping, and calculate the area in sq. yds.

Record results thus :

	Length of Base (BC)	Perpend. Height (AD).	Area.	
			Sq. Chns.=	Sq. Yds.
Chains.				
Yards (by stepping).				
AMOUNT OF ERROR =				

SECTION III.—VOLUME AND CAPACITY.

29. The Cylinder.

(a) Fill a record-case or mantle-box with fine sawdust or silver sand, taking care that the surface is quite level. Then empty into the graduated measuring glass.

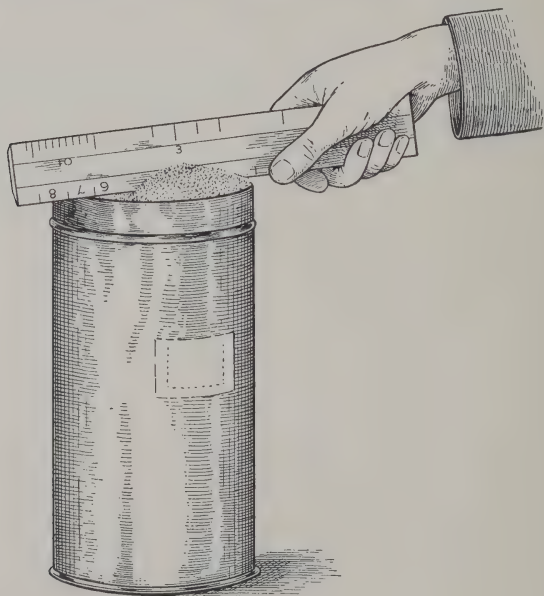


FIG. 22.—How to fill a Vessel with Sand.

(b) How many cubic inches of sawdust or sand are there ?

(c) How many cubic centimetres ?

(d) In your note-book draw up two tables as shewn below, and record the above results in the first columns.

(e) Find the area of the base of the box,

(i) In square inches, (ii) In sq. cms.

Record results.

(f) Find the exact height of the box,

(i) In inches, (ii) In cms.

Record results.

(g) Multiply the area of the base by the height, and record results.

(h) Compare the results in columns 1 and 4 of each table.

(i) Take other boxes of similar shape. Repeat the above operations, and enter results under the previous ones.

(j) By comparing your results in columns 1 and 4, can you determine a method of finding the volume of a cylindrical object by measurement and calculation? Write down this method as briefly as possible.

I.

	(1)	(2)	(3)	(4)
No.	Volume of contents. Cu. ins.	Area of base. Sq. ins.	Height. Ins.	(Area of base) $\times$ (Height). Cu. ins.
<i>A</i>	72	15.5	4.7	

II.

No.	Volume of contents. Cu. cms.	Area of base. Sq. cms.	Height. Cms.	(Area of base) $\times$ (Height). Cu. cms.
<i>A</i>	1100	100	12	

30. Volume of a Cylinder of given Dimensions.

(a) Construct a cylinder of cardboard as instructed by your teacher.

(b) Fill the cylinder with sawdust, and by means of the graduated measuring glass, find its volume,

(i) In cu. ins.,

(ii) In cu. cms.

Record results in the table used for Ex. 29.

(c) Carefully measure the diameter and height of the cylinder, and calculate its volume as in the preceding Exercise.

(d) Record these results, and compare the volumes by measurement with those found by calculation.

31. Cylindrical Iron Pillars in Playshed, or Rain Water-Pipe.

(a) Measure the diameter of one of the pillars in inches,

(i) By using square wooden blocks,

(ii) „ a slide rule, or,

(iii) „ calipers.

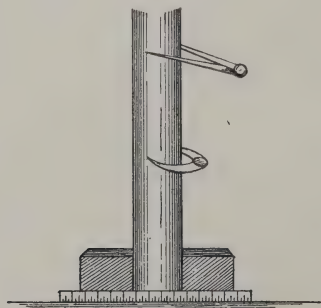


FIG. 23.

(b) Measure the height of the same pillar in ft. and ins.

(c) Calculate the number of cu. ft. of iron in the pillar, or, in the case of rain water-pipe, its volume.

(d) Record results in your note-book.

(e) When told the other results, find the average result for the class, and enter the same below your own.

32. The Principle of the Wedge.

(a) Cut out in cardboard a right-angled triangle, as shewn in Fig. 24.

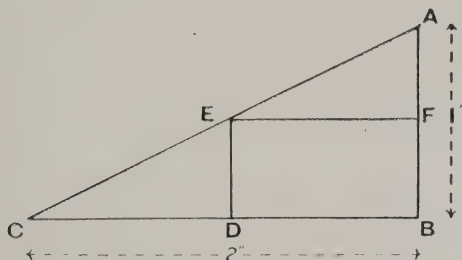


FIG. 24.

(b) Bisect BC at D .

(c) From D draw DE perpendicular to BC .

(d) From E draw EF parallel to the base.

(e) Cut off the triangle EDC , place it on the triangle AFE , and compare their sizes.

(f) Also compare AF and FB .

(g) Write in your note-book, as briefly as you can,

(i) What you have discovered about the two triangles,

(ii) „ „ „ position of point F .

33. The Application of the Wedge.

(a) Cut out from squared paper a triangular piece, as shewn in Fig. 25.

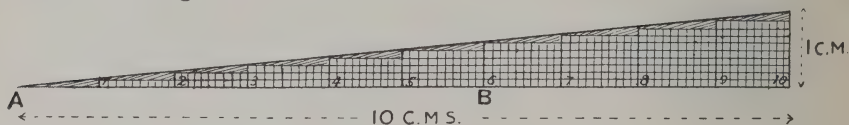


FIG. 25.

(b) Number the upright lines as shewn, and lightly shade the ten small triangles.

(c) From Ex. 32 what do you know of the sizes of these triangles?

(d) How many of these triangles would make up the total width of the wedge?

(e) Hence how wide is the wedge

(i) At 1 ? (ii) At 4 ? (iii) At 7 ?

(f) If you can insert the wedge in a piece of pipe as far as 4, what is the diameter of the pipe?

(g) At any mark, *e.g.* B, what part of the length from A is the width?

Write this result in your note-book in a short statement.

(h) Construct a wedge 10 ins. long and 1 in. high in the same way.

34. Volume of Cylindrical Pieces of Iron or Lead Piping.

(a) Measure the diameter of a piece of piping (using wooden blocks, calipers or compasses), and record results in your note-book as shewn.

(b) Measure the internal diameter of the same piece (using the cm. or inch wedge made in last lesson). Record your results.

(c) Measure the length of the piece.

(d) Calculate the volume of the whole, as if it were a solid cylinder.

(e) Calculate the volume of the bore.

(f) Find, by subtraction, the actual volume of metal in the piece of piping.

(g) Record all results thus :

No.	External Diameter. Ins.	Internal Diameter. Ins.	Length. Ins.	External Volume. Cu. ins.	Internal Volume. Cu. ins.	Volume of Metal. Cu. ins.
<i>e.g.</i> Pipe 1	$1\frac{3}{4}$	1	8	$19\frac{1}{4}$	$6\frac{2}{7}$	$12\frac{27}{28}$
" 2						
" 3						

35. The Pint Measure.

(a) Carefully measure the diameter and height of the pint measure, and calculate its volume in cu. ins. and cu. cms.



FIG. 26.



FIG. 27.

(b) Make a sketch of the pint measure, and insert the numbers of cu. ins. and cu. cms. that it contains. (See Fig. 26.)

36. The Litre Measure.

(a) Carefully measure the diameter and height of the litre measure, and calculate its volume in cu. cms.

(b) What is the amount of your error (in cu. cms.) ?

(c) Make a sketch of the litre measure near that of the pint.

(d) From your results, what fraction of a litre is a pint ?

37. Volume of a Cone.

(a) Construct a cone of cardboard so that it will just fit into the cylinder made in Ex. 30.

(b) Place the cone inside the cylinder.

(c) Carefully fill around the cone with fine sawdust, or silver sand, until level with the tops of cone and cylinder. (See Fig. 28.)

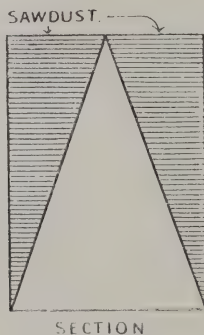


FIG. 28.

(d) Empty the sawdust, and measure its volume in cu. ins.

(e) What was the volume of the same cylinder ?

(f) What is the volume of the cone ?

(g) Now invert the cone, and fill it with sawdust.

(h) Empty the sawdust, and measure its volume in cu. ins.

(i) Compare this with the previous result (f) and take the average.

(j) Exchange the cone and cylinder with others, and repeat above operations.

(k) Compare the volume of the cone with that of the cylinder of equal base and height.

What is the approximate relation of one to the other ?

Write this as briefly as you can.

(l) Record your results thus :

	(1)	(2)	(3)	(4)	(5)	
No.	Vol. of Cylinder (from Ex. 30). Cu. ins.	Vol. of Sawdust round Cone. Cu. ins.	Vol. of Cone. (1) and (2). Cu. ins.	Vol. of Cone by filling. Cu. ins.	Average of (3) and (4). Cu. ins.	Vol. of Cone Vol. of Cylinder
1	58	38	20	18	19	$\frac{1}{3} \frac{9}{3} = \frac{1}{3}$ approx.
2						
3						

SECTION IV.—WEIGHT.

38. Estimation of Weight—Pounds.

(i) Take the bag of sand supplied to you, and estimate its weight in lbs. after balancing same in your hand.

(ii) Find its correct weight, by means of the spring balance.

(iii) Record results.

(iv) Deal similarly with other bags.

(v) Record all results, and complete thus :

<i>e.g.</i>	No.	Estimated Weight.	Actual Weight.	Amount of Error.
	1	2 lbs.	$1\frac{1}{2}$ lbs.	$\frac{1}{2}$ lb.
TOTAL ERROR =				
AVERAGE ERROR =				

39. Estimation of Weight in the Metric System—Kilograms.

(i) Make yourself familiar with the kilogram, 500 grams, and 250 grams.

Use these known weights as the basis of your estimations.

(ii) Estimate the weight of the bag of sand supplied to you.

(iii) Find its correct weight, by means of the spring balance.

(iv) Record results, and complete as in Ex. 38.

40. Estimation of Weight, introducing Comparison.

(i) Take the given object, and estimate its weight.

(ii) From the bags of known weight, select that which is nearest the weight you have estimated.

(iii) Balance the object and the selected bag in your hands.

(iv) By comparing, re-estimate the weight of the object, if necessary.

(v) Find the correct weight, by means of the spring balance.

(vi) Record results, and complete thus :

	(1)	(2)	(3)	(4)	(5)
	No.	Estimated Weight.	Second Estimation of Weight.	Actual Weight.	Error—First. Diff. between (1) and (3). Error—Second. Diff. between (2) and (3).
<i>e.g.</i>	1	9 lbs.	$8\frac{1}{2}$ lbs.	8 lbs.	1 lb. $\frac{1}{2}$ lb.
TOTAL ERROR =					
AVERAGE ERROR =					

(vii) Repeat the exercise, using metric weights, and record your results in a separate table.

41. Graph of Weight.

(a) Take your weight in stones and lbs. at regular intervals and record on the graph.

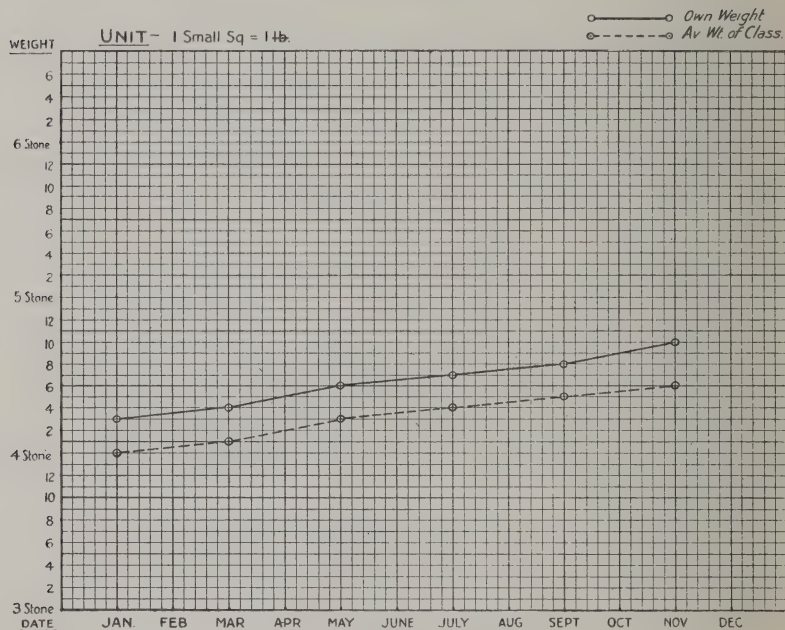


FIG. 29.—Graph of Weight.

(b) Insert the graph shewing the average weight of the class.

(c) By how much does your weight differ from the average weight?

SECTION V.—TIME.

42. The Pendulum.

(a) Attach a small weight to the end of a piece of cord. Hold the free end of the cord so that the pendulum can oscillate freely.

(b) Set the pendulum oscillating, and find the time taken for 20 oscillations (Fig. 30).

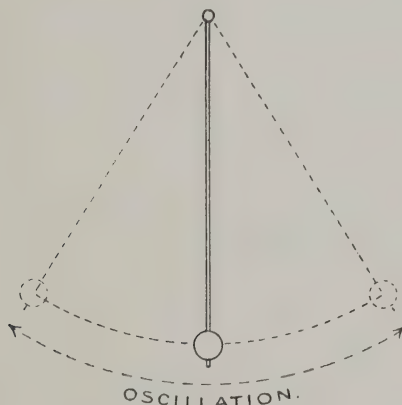


FIG. 30.

(c) Attach a heavier weight to the cord, and repeat as in (b).

(d) Attach a lighter weight to the cord, and repeat as in (b).

Record results thus :

Kind of Weight used.	No. of Oscillations.	Time Taken.
Medium	20	
Heavy	20	
Light	20	

(e) By reference to above table, what conclusion can you draw from your observations ?

43. Time of Oscillation.

(a) Take the pendulum, as used in Ex. 42, and make it oscillate *widely* 30 times.

(b) Find the time taken.

(c) Take the same pendulum, and make 30 *very small* oscillations.

(d) Find time taken.

(e) Repeat the operations with pendulums having varying lengths of string.

Record results thus :

Length of Cord.	Nature of Oscillation.	No. of Oscillations.	Time Taken.
24 ins.	Wide		
24 ins.	Small		

(f) By reference to above table, what conclusion can you draw from your observations ?

44. Varying Length of Pendulum.

(a) Make a pendulum having string 2 ft. long.

(b) Find the number of oscillations made in 60 seconds.

(c) Using a pendulum having string 1 ft. long, find the number of oscillations made in 60 seconds.

(d) Make a pendulum with any length of string, and repeat as in (b).

Record results thus :

Length of Cord.	Number of Oscillations.	Time.
24 ins.		60 secs.

(e) What conclusion can you draw from your results ?

45. The Seconds Pendulum.

(a) Vary the length of the cord until 30 oscillations are made in 30 seconds (*i.e.* one oscillation per second).

(b) Carefully measure the length of the cord from the point of suspension to the middle of the bob.

Record result in table used in Ex. 44.

46. The Stop-Watch—Rate of Motion.

(a) Walk along the chain line laid down in the playground, and endeavour to walk

- (i) 2 steps per second, (ii) 1 step per second.

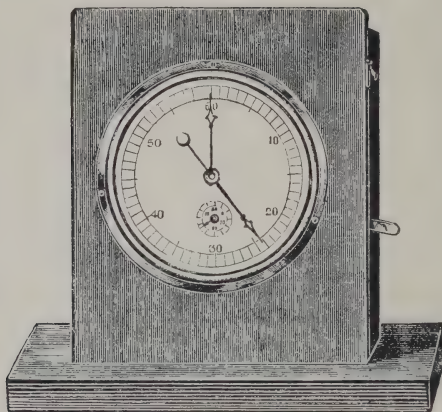


FIG. 31.—Stop-clock.

Record results thus :

No. of Steps taken.	Time.	Number of Steps.	No. of Steps per sec.	No. of Steps per sec. required.
25	28 secs.	Too few.	.89	1

47. The Pendulum—Rate of Motion.

(a) Run a distance of 55 yards, while your partner times you by means of a “seconds” pendulum.

(b) Change places with partner, and repeat.

Record results thus :

Distance.	Time Taken (in seconds).	Rate of Motion (Miles per hour).





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